

**NIRMA UNIVERSITY**  
**SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY**  
**M.Tech. in Electronics & Communication Engineering (VLSI Design)**  
**M.Tech. Semester - II**  
**Department Elective II**

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<b>Course Code</b>	<b>3EC12D204</b>
<b>Course Title</b>	<b>VLSI System on Chip</b>

**Course Learning Outcomes (CLOs):**

At the end of the course, students will be able to -

1. Analyze modeling styles for design of system on chip.
2. Design data path architectures and solve intra-chip communication issues for given system on chip.
3. Apply partitioning and floor planning algorithms for effective system on chip design.
4. Utilize System Verilog, TLM, and System C for modeling and testing of system on chip.

**Syllabus:**

**Teaching Hours:45**

<b>UNIT I: Introduction</b>	<b>05</b>
System on Chip technology challenges, System on a Chip (SoC) components, SoC design methodology.	
<b>UNIT II: SoC Architecture</b>	<b>07</b>
Parameterized SoC, SoC peripheral cores, SoC and Interconnect Centric Architectures	
<b>UNIT III: System Level Design</b>	<b>09</b>
System level design representations and modelling languages, Target architecture models, Intra-chip communication, Graph partitioning algorithms, Floor planning algorithms, Task time measurement	
<b>UNIT IV: Synthesis and Timing Analysis</b>	<b>09</b>
Interconnect latency modelling, Back annotation of lower level timing to high-level models, Synthesis of SoC components.	
<b>UNIT V: SoC Verification and Testing</b>	<b>15</b>
System level verification, Block level verification and Hardware/Software Co-verification using System C, TLM, System Verilog, Emulation, Physical Verification.	

**Self-Study:**

The self-study contents will be declared at the commencement of Semester. Around 10% of the questions will be asked from self-study contents.

**Suggested Readings:**

1. Wayne Wolf, Modern VLSI Design: SOC Design, Pearson Education.
2. Prakash Rashnikar, Peter Paterson, Lenna Singh, System-on-a-Chip, Verification Methodology & Techniques, Kluwer Academic Publishers.
3. Alberto Sangiovanni Vincentelli, Surviving the SOC Revolution: A Guide to Platform based Design, Kluwer Academic Publishers.
4. J. Bhasker, A System C Primer, Star Galaxy.